

p.122 #24

$$2x^3 - 9x^2 + 12x - k = 0$$

double root  $\rightarrow (x+a)^2 (2x-b) = 0$

$$(2x-b)(x^2 + 2ax + a^2) = 0$$

$$2x^3 + 4ax^2 + 2a^2x - bx^2 - 2abx - a^2b = 0$$

$$2x^3 + (4a-b)x^2 + (2a^2 - 2ab)x - a^2b = 0$$

\* compare the coefficients.

$$\therefore 4a - b = -9$$

$$4a = b - 9$$

$$a = \frac{b-9}{4} \quad \textcircled{1}$$

$$2a^2 - 2ab = 12$$

$$2a(a-b) = 12 \quad \textcircled{2}$$

sub ① into ②:  $2 \left( \frac{b-9}{4} \right) \left( \frac{b-9}{4} - b \right) = 12$

multiply by 16:  
÷ divide by 2

$$(b-9)(b-9-4b) = 6(16)$$

$$(b-9)(-3b-9) = 96$$

$$-3b^2 - 9b + 27b + 81 - 96 = 0$$

$$b^2 - 6b + 5 = 0$$

$$(b-5)(b-1) = 0$$

$$\therefore b = 5 \quad \text{or} \quad b = 1$$

$$\therefore a = \frac{5-9}{4}$$

$$a = -1$$

$$a = \frac{1-9}{4}$$

$$a = -2$$

$$k = a^2 b$$

$$\therefore k = 5$$

or

$$k = 4$$

$\therefore$  Product is 20.